

Efficacy assessment of soil insecticides and seed treatments for the control of western corn rootworm larvae

Wirksamkeit von Bodeninsektiziden und Saatgutbehandlungen zur Bekämpfung des Westlichen Maiswurzelbohrers

Christina Pilz¹, Andreas Kahrer^{1,*}, Giselher Grabenweger¹, Udo Heimbach²

¹ Institute for Sustainable Plant Production, Agency for Health and Food Security (AGES), Vienna, Austria

² Institute of Plant Protection in Field Crops and Grassland, Julius Kühn-Institute (JKI), Braunschweig, Germany

* Corresponding author, andreas.kahrer@ages.at

DOI 10.5073/jka.2014.444.025

Western corn rootworm larvae develop and feed below ground and cause severe damage to maize roots. The most important target of control measures against this pest are larval stages in the soil. The presented study deals with various attempts of corn rootworm larval control by insecticides. The efficacy of granular soil insecticides and insecticides as seed coating is influenced by several factors, such as the abundance of the pest insect, the formulation, the timing of the application of the control measures or soil type. These factors have been investigated in a series of experiments presented here. It was the aim to evaluate various control options and to define the most suitable and environmentally safe control method against western corn rootworm larvae.

Experiments were carried out in heavily infested corn fields and in virtually pest-free first year maize fields in Austria. Maize plants in experimental plots were artificially infested with defined numbers of *Diabrotica* eggs, to ensure a homogenous distribution of naturally occurring corn rootworm populations and to simulate different levels of infestation. Soil types were roughly differentiated into heavy, medium and light soils. Insecticides tested contained the active ingredients Clothianidin, Tefluthrin and Spinosad. Control measures were carried out during sowing of maize in mid-April. Experiments were evaluated by counting adult beetles emerging from experimental plots in emergence cages and by rating damage on the maize roots caused by corn rootworm larvae according to the "Node Injury Scale".

Insecticides showed medium efficacy in reducing the number of emerging beetles. In general, Clothianidin proved to be most efficient in protecting roots from larval damage. Therefore, the tested insecticides seem to be useful for plant protection but are of limited use for eradication measures, against the quarantine pest.

Influence of different soil types on the survival rates of the pest insect as well as on the performance of insecticides is still unclear. However, experiments have shown that rootworm larvae are susceptible to desiccation. Therefore, survival rates in sandy soils were lower than in heavier ones.

The project was funded by the German Ministry of Food, Agriculture and Consumer Protection (BMELV) within the German *Diabrotica* research program.